

Application No.: 10/571,426

REMARKS

Claim 1 is objected for minor informalities. It is respectfully submitted that the enclosed amendment obviates the alleged informalities. Accordingly, it is respectfully requested that this objection be withdrawn.

Claim 1 is independent and stands rejected under 35 U.S.C. § 103 as being unpatentable over JP '394, and claim 8 stands rejected under 35 U.S.C. § 103 as being unpatentable over JP '394 in view of Inoue '905 ("Inoue"). These rejections are respectfully traversed for the following reasons.

A. Claim 1

It is respectfully submitted that JP '394 does not disclose or suggest the claimed combination of elements as arranged and configured in claim 1. Further, claim 1 recites in pertinent part, "a depth of the isolation region is smaller than that of the first semiconductor layer." Support for this feature can be found, for example, in paragraphs [0035] and [0035] of Applicants' specification. In direct contrast, as shown in Figure 2, the alleged isolation region 9 of JP '394 has a depth which is purposely larger than the alleged first semiconductor layer of the photoelectric conversion section. Indeed, the alleged isolation region 9 of JP '394 has a depth which is larger than the entire PD.

In this regard, it should be noted that the alleged isolation region 9 of JP '394 is specifically configured as a gettering field to remove metal impurities from the pixel region (see paragraphs [0020] - [0022]). Accordingly, JP '394 expressly desires the alleged isolation region 9 to extend deeper than the PD down to the p-well region (e.g., 2a in Fig. 2) so that the isolation region does not have a depth which is smaller than a charge accumulation region. As a gettering

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field, therefore, JP '394 relies on the alleged isolation region 9 to have such a depth, thereby teaching away from the claimed configuration.

According to one aspect of the present invention, the claimed combination of elements can make it possible to equalize the coefficients of thermal expansion of the isolation region and the silicon substrate, thereby avoiding stress-induced defects in the photoelectric conversion section. Only Applicants have recognized and considered such effects, and conceived of the novel and non-obvious combination of elements which can make it possible to realize said effects. JP '394, on the other hand, is completely silent as to the aforementioned effects much less suggest the needed configuration of the alleged isolation region 9 to realize said effects. In direct contrast, as noted above, JP '394 expressly teaches away from the claimed configuration.

B. Claim 8

Claim 8 recites in pertinent part, "during the step of implanting an impurity, a P-type impurity is implanted into a region between the N-channel transistors in the isolation region, and a region between the N-channel transistor and the photoelectric conversion section in the isolation region, and wherein during the step of implanting an impurity, an N-type impurity is implanted into a region between the P-channel transistors in the isolation region, and a region between the P-channel transistor and the photoelectric conversion section in the isolation region." Support for this feature can be found, for example, in paragraphs [0030] and [0047] of Applicants' specification. It is respectfully submitted that neither JP '394 nor Inoue, alone or in combination, disclose or suggest the claimed combination as now embodied by claim 8.

Moreover, it is respectfully submitted that JP '394 and Inoue are not combinable with respect to the aforementioned features of claim 8. Specifically, as noted above, JP '394 discloses a polysilicon material which is embedded into a trench isolation so that the isolation region is

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configured to function as a gettering region for removing metal impurities. On the other hand, Inoue expressly discloses a trench isolation which is filled with SiO₂ from which metal impurities are not removed. Accordingly, JP '394 teaches away from modification by the disclosure of Inoue in that the disclosed device of Inoue would destroy the intended purpose of the trench isolation of JP '394 (i.e., functioning as a gettering region).

"All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 165 USPQ 494, 496 (CCPA 1970).

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claims 1 and 8 are patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also patentable. In addition, it is respectfully submitted that the dependent claims are patentable based on their own merits by adding novel and non-obvious features to the combination.

Based on the foregoing, it is respectfully submitted that all pending claims are patentable over the cited prior art. Accordingly, it is respectfully requested that the rejection under 35 U.S.C. § 103 be withdrawn.

CONCLUSION

Having fully responded to all matters raised in the Office Action, Applicants submit that all claims are in condition for allowance, an indication for which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's

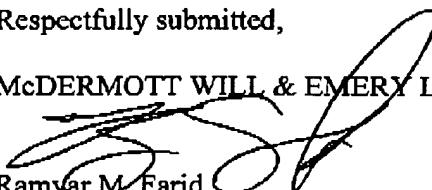
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amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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